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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/708,801	03/26/2004	ANTHONY S.T. CHIANG	10731-US-PA	2800

31561 7590 09/19/2007 JIANQ CHYUN INTELLECTUAL PROPERTY OFFICE 7 FLOOR-1, NO. 100 ROOSEVELT ROAD, SECTION 2 TAIPEI, 100 TAIWAN	
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EXAMINER
HANOR, SERENA L

ART UNIT	PAPER NUMBER
1709	

NOTIFICATION DATE	DELIVERY MODE
09/19/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

USA@JCIPGROUP.COM.TW

Office Action Summary

Application No.

10/708,801

Applicant(s)

CHIANG ET AL.

Examiner

Serena L. Hanor

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) ☐ Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. ____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>03/26/2004</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION***Specification: Objections***

1. The disclosure is objected to because of the following informalities:

- p. 1 [0003] oxidenanoparticlesol
- p. 2 [0006] incorporatednanoparticles
- p. 3 [0007] (the sol) remain
- [0008] (Additionally,) the
- (above) methodswould
- p. 4 [0009] (the same) havingzirconia
- (weak interaction) therebetween
- [0013] (more than 90% of) thezirconia
- p. 5 [0015] (without or with only) weak-association
- p. 6 [0019] (zirconium hypochloride) or other
- p. 8 [0022] In step 106, conditioning the product to form an acid mud, and the acid mud has a pH value lower than 3.
- [0022] In the embodiment, the product is conditioned to form the acid mud is, for example, an organic acid and an organic dispersing agent may be used for conditioning the product, wherein the amount of the organic dispersing agent in the zirconia sol is about 10%~15wt% based on the solid weight.
- p. 9 [0025] (noted that) because the
- [0026] (In view of the) foregoing

Appropriate correction is required.

Claims: Objections

2. Claims 1 objected to because of the following informalities:
 1. (more than 90% of) the zirconia
 3. (average primary) particles
 5. (conditioning the product to form) an acid mud
 15. The method according to claim 5, the buffer solution contains ammonium carbonate.
 20. (average primary) particles
 21. (average primary) particles
 24. (an organic acid and an organic dispersing agent) is

Appropriate correction is required.

Claim Rejections - 35 USC § 112, 2nd

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 5, 9, 24-28 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
5. Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d

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1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The terms "conditioning", "acid mud", "dosing speeds", and "organic dispersing agent" in claims 5, 9, 24-28 are used by the claims to mean undisclosed process steps and compounds, while the accepted meaning is unknown. The terms are indefinite because the specification does not clearly redefine the term.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. Claims 1-10, 12-15, 18-32 rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,376,590 B2 (hereafter, US'590) in view of US 5,234,870 (hereafter, US'870).

Claims 1-10, 12-15, 18-32 are drawn to a zirconia sol comprising zirconia crystals in the form of tetragonal and cubic crystal lattice structures. The sol exhibits transmittance, and its average primary particle size is 7-20 nm. The

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preparation of said zirconia sol involves mixing an inorganic zirconium salt, an organic acid, a buffer solution, and an organic amine, heating the mixture, and conditioning it to form an acid mud and then a neutral sol.

US'590 teaches a hydrothermal process and the product zirconia sol comprising an aqueous phase having single crystal zirconia particles with an average primary particle size less than about 20 nm (see Abstract and col. 7 line 17). Furthermore, of the crystalline phase, about 70% or greater exists in combined cubic and tetragonal crystal lattice structures (see Abstract). US'870 teaches a transparent zirconia sol obtained by the hydrolysis of zirconyl ammonium carbonate and a chelating agent incorporated into said transparent zirconia sol (see Abstract).

US'590 differs from the instant claims in that it fails to teach the use of an organic amine, and it uses a higher hydrolysis temperature of 140-250°C and a high pressure autoclave. Furthermore, the pH of the sol is claimed as "less than about 7", but this falls within the instant claimed range of 5-10.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of US'870 to use a zirconium salt that is ultimately heated at a low temperature to obtain a zirconia sol with crystalline particle size less than 20 nm.

One would have been motivated to make such a modification of combining the use of an organic amine, a zirconium salt as the starting product, and a low temperature hydrolysis for economic and industrial reasons, i.e. the inexpensive production of zirconia nanoparticles. The incorporation of zirconia nanoparticles

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into organic matrix materials can increase the refractive index of optically transparent materials.

9. Claims 5, 11, 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5223,176 (hereafter, US'176) in view of US 4,784,794 (hereafter, US'794).

US'176 teaches a stable basic zirconia sol that can be prepared by adding a dispersion stabilizer to an acidic aqueous zirconia sol and thereafter adjusting the sol with a basic compound to pH 6-14.

US'176 differs from the instant claims in that it does not include a heating treatment, and the dried sol is not dissolved in a polar solvent.

US'794 discloses a high dispersion sol of monoclinic zirconia supermicrocrystals which is translucent and contains crystals of uniform size. The sol is produced by preparing an aqueous solution of a zirconium salt of hydroxide and hydrochloric acid, subjecting the aqueous solution to hydrothermal treatment in a sealed container at more than 130°C for more than 24 hours to give a white pasty product, diluting the product with water and adjusting the pH to 3-7, and finally concentrating the diluted product.

However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process disclosed by US'176 to incorporate an aqueous solution that is subjected to a heating treatment to dry the crystals and then dissolved in a polar solvent to produce a transparent sol. On the other hand, a dispersion stabilizer could easily be added to the process of

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US'794 and the heating temperature could be lowered to produce tetragonal and cubic crystal structures.

One would have been motivated to make such a modification to US'794 for economic reasons. A lower heating temperature and shorter heating duration would cost less money and take less time, which means more crystals could ultimately be produced.

Conclusion

10. No claim is allowed.

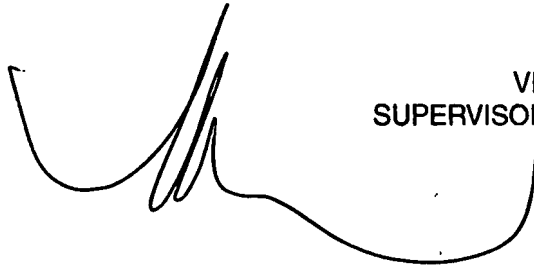
11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Serena L. Hanor whose telephone number is (571) 270-3593. The examiner can normally be reached on Monday - Thursday 8:30 AM - 5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571) 272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SLH

A handwritten signature in black ink, consisting of a series of loops and strokes, positioned above the printed name and title.

VICKIE Y. KIM
SUPERVISORY PATENT EXAMINER